REMARKS

In the Office Action, the Examiner rejected claims 1-33 under 35 U.S.C. §101 on the ground of non-statutory subject matter. The Examiner also rejected claims 1-2, 23, 27-29, 31-35, 46-47, and 49 under 35 U.S.C. §102(e) as being anticipated by the United States Patent 6,958,757 issued to Karlov ("Karlov"). The Examiner also rejected claims 4-6, 8-9, and 24-25 under 35 U.S.C. §103(a) as being unpatentable over Karlov in view of the United States Patent 7,006,101 issued to Brown, et al. ("Brown"), further in view of the United States Patent 6,470,443 issued to Emer, et al. ("Emer). The Examiner also rejected claims 10-12 and 37-39 under §103(a) as being unpatentable over Brown in view of Emer. The Examiner also rejected claims 13 and 40 under §103(a) as being unpatentable over Brown and Emer in view of the United States Patent 4,876,651 issued to Dawson, et al. ("Dawson"). The Examiner also rejected claims 14, 20, and 41 under §103(a) as being unpatentable over the United States Patent 5,657,478 issued to Recker, et al. ("Recker") in view of Emer. The Examiner also rejected claims 15-19, 22, and 42-44 under §103(a) as being unpatentable over Recker and Emer in view of the United States Patent 6,995,770 issued to Ngai ("Ngai"). The Examiner also rejected claim 21 under §103(a) as being unpatentable over Recker and Emer in view of Dawson. The Examiner also rejected claims 26 and 45 under §103(a) as being unpatentable over Karlov in view of the United States Patent 6,933,945 issued to Emberling ("Emberling"). Furthermore, the Examiner objected to claims 36 and 48 as being dependent upon a rejected based claim. However, the Examiner stated that claims 36 and 48 would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

In this Amendment, Applicants have added claims 50-51. Applicants have amended claims 1, 4-7, 10, 11, 14, 17, 26, 27, 34, 37, 41, and 44-46. The amendments are made for reasons of clarity and not for reasons of patentability. Applicants do not surrender any equivalents of the amended claims. Accordingly, claims 1-51 will be pending after entry of these amendments.

I. Rejection to Claims 1-33 under 35 U.S.C. §101

In the Office Action, the Examiner rejected claims 1-33 under §101, stating that claims 1-33 are best directed to an abstract idea and that the claims do not recite an invention producing a useful, concrete, and tangible result. Specifically, the Examiner stated that the claims do not produce a tangible result as the claims do not produce a real-world result.

First, Applicants respectfully traverse the rejection and submit that claims 1, 26, and 27 recite steps for producing a useful, concrete, and tangible result. The claims provide the useful result of efficiently processing video data by executing a group of image routines using a processor and a cache. The claims provide the tangible result through their non-abstract steps. According to the Patent Office Guidelines, "the opposite of tangible is abstract". Here, the steps necessary to generate the processed bands include the non-abstract (i.e. tangible) steps of executing at least two image processing routines using a processor that retrieves bands of video data from a computer cache, processes the bands, and produces output data to the same cache. Moreover, such steps produce a physical transformation of the cache by overwriting the unprocessed set of video data initially in the cache with the newly produced output data that is stored to the cache. Applicants respectfully submit that the processor and cache are physical objects and the transformation of the cache using the processor produces a tangible and real-world result as the newly produced output data is accessible by other physical components of the computer system. Additionally, claims 1, 26, and 27 produce a concrete (i.e. repeatable) result. Every time the steps of the method are performed, the original frame of video data is processed using the image processing routines.

Second, Applicants respectfully submit that amended claims 4, 10, and 14 recite steps for producing a useful, concrete, and tangible result. These claims recite a useful result in providing the ability to efficiently process image routines by associating a set of routine identifiers that group or combine related routines. The claims specify a tangible result by reciting a physical transformation of a computer-readable medium. The physical transformation occurs when the list of routine identifiers or the output of the routines is stored within the computer-readable medium. In this manner, a tangible real-world result is created as different components of the computer system or applications may access the stored lists or results in the computer-readable medium. Furthermore, the claims recite a reproducible set of operations for processing video data and thus provide a concrete result.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the §101 rejection of claims 1, 4, 10, 14, 26, and 27. Given that claims 2-3, 5-9, 11-13, 15-25 and 28-33 are dependent upon claims 1, 4, 10, 14, 26, and 27, Applicants respectfully submit that these claims be allowable for at least the same reasons that were provided above for claims 1, 4, 10, 14, 26, and 27. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §101 rejection of claims 1-33.

II. Rejection to Claims 1, 2, 23, 26-29, 31-35, 45-47, and 49 under §102(e)

In the Office Action, the Examiner rejected claims 1, 2, 23, 27-29, 31-35, 46, 47, and 49 under §102(e) as being anticipated by Karlov. The Examiner also rejected claims 26 and 45 under §103(a) as being unpatentable over Karlov in view of Emberling. Claims 2 and 23 are dependent on claim 1. Claim 1 recites a method of executing a set of at least two image processing routines on a processor using a particular cache. Each routine in the set of routines processes at least one source, which is a frame of video data. The method divides a source into at least two bands and determines a size of a band based on the size of the particular cache. The method executes the set of routines in two or more passes. During each pass, the routine processes at least one band from the particular cache and produces output data stored to the particular cache.

Applicants respectfully submit that Karlov does not render claim 1 unpatentable. for at least the following reasons. Applicants respectfully submit that Karlov does not disclose, teach, or even suggest processing routines that retrieve a band from a particular cache to produce output data stored to the same particular cache. Instead, Karlov specifies performing its operations through the use of two separate caches, an L2 cache and a write-combine cache. *See*, Karlov, column 11, lines 43-45.

In the Office Action, the Examiner cited column 12, lines 19-26 of Karlov to suggest the execution of two image processing routines where the input to the routine is retrieved from a particular cache and the output of the routine is stored in the same particular cache. However, the cited lines recite the “Dual-Cache Method” of Karlov. *See*, Karlov, column 11, lines 43-45. Karlov retrieves a band from the L2 cache and stores the output in the write-combine cache. *See*, Karlov, column 12, lines 2-4. As further illustrated in Figure 2 of Karlov, the L2 cache (218) is an entirely separate cache from the write-combine cache (216). Therefore, Karlov specifies the use of two separate caches. Accordingly, Applicants respectfully submit that Karlov does not disclose, teach, or even suggest processing routines that retrieve a band from a particular cache to produce output data stored to the same particular cache.

In view of the foregoing remarks, Applicants respectfully submit that Karlov does not render claim 1 invalid. Given that claims 2 and 23 are dependent on claim 1, Applicants respectfully submit that these claims be allowable over the cited reference for at least the same reasons that were provided above for claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §102(e) rejections to claims 1, 2, and 23.

Furthermore, claims 26-29, 31-35, 45-47, and 49 were rejected along the same rationale as claim 1. Accordingly, claims 26-29, 31-35, 45-47, and 49 are patentable over Karlov because Karlov does not disclose, teach, or even suggest retrieving a band from a particular cache and producing output to the same particular cache, as mentioned above. Applicants respectfully submit that the cited reference does not render claims 26-29, 31-35, 45-47, and 49 invalid. Applicants respectfully request reconsideration and withdrawal of the rejections to claims 26-29, 31-35, 45-47, and 49.

III. Rejection to Claims 4-6, 8, 9, 24, and 25 under §103(a)

In the Office Action, the Examiner rejected claims 4-6, 8, 9, 24, and 25 under §103(a) as being unpatentable over Karlov in view of Brown, further in view of Emer. Claims 5-6, 8, 9, 24, and 25 are directly or indirectly dependent on claim 4. Claim 4 recites a method of processing a group of image processing routines on a processor by using a cache. Each routine in the group of routines processes at least one frame of video data. The method determines an initial list of routine identifiers positioned in a specific order. The group of routine identifiers identifies the group of image processing routines, where each routine identifier identifies a corresponding routine in the group of routines. The method groups two or more routine identifiers and modifies the initial list of routine identifiers to indicate the grouping of the at least two routine identifiers to produce a modified list of routine identifiers. The grouping of routine identifiers and the modification of the initial list are performed by a set of instructions executed by the processor. The method executes the routines identified in the modified list and stores the output of the routines to a computer-readable medium.

Applicants respectfully submit that Karlov, Brown, Emer, or their piecemeal hindsight combination, does not disclose, teach, or even suggest the method of claim 4 for at least the following reasons. *First,* Applicants respectfully submit that these references do not disclose, teach, or even suggest a set of instructions executed by a processor for grouping at least two routine identifiers of an initial list of routine identifiers prior to modifying the initial list. In the Office Action, the Examiner correctly indicated that Karlov does not specify the grouping at least two routine identifiers. However, the Examiner cited column 13, lines 48-49 and column 9, lines 21-28 of Brown to suggest the above limitations.

The Examiner first cites column 13, lines 48-49 of Brown to suggest an initial list of routines without condition codes and branching instructions. Then, the Examiner cites column 9, lines 21-28 of Brown to suggest a modified list of routines including condition codes and branching instructions. However, nowhere within the cited lines or anywhere else within Brown is a set of instructions that are executed by a processor to group and modify the list of routines disclosed, taught, or even suggested. Rather, the alleged grouping of routines in Brown is a manual operation that would occur after a programmer manually modifies the suggested initial list to make use of the condition codes and branching instructions provided by Brown. Therefore, Applicants respectfully submit that nowhere within Karlov, Brown, Emer, or their piecemeal hindsight combination is the set of instructions executed by a processor for grouping routines disclosed, taught, or even suggested to occur before modifying the initial list of routines.

Second, Applicants respectfully submit that these references do not disclose, teach, or even suggest producing a modified list of routine identifiers prior to executing the routines identified in the modified list of routine identifiers. In the Office Action, the Examiner cited column 1, lines 18-25, column 4, lines 1-10 and 60-63 of Emer to suggest the modification of an initial list of routine identifiers to produce a modified list of routine identifiers and execution of the modified list. In the Office Action, the Examiner stated that "since Emer teaches changing the execution ordering of the list of routine identifiers, and the execution ordering is considered to be a list of routine identifiers, Emer is considered to teach modifying the list of routine identifiers." *See*, Office Action, page 13 (emphasis added). Applicants respectfully submit that the Examiner has stated that the modification of the list of routine identifiers of Emer occurs at the time of instruction execution. Specifically, Emer cannot issue its instructions out-of-order until the resources for the particular instructions become available and this determination cannot be made until the execution of the instructions begins. However as stated in claim 4, the modification of the list of routine identifiers occurs separately and precedes the execution of the modified list of routine identifiers.

Furthermore, column 4, lines 60-63 of Emer specifies redefining a set of registers used by an instruction during execution as opposed to the limitation of claim 4 that states producing a modified list prior to execution of the modified list. *See*, Emer, column 5, lines 1-3. Therefore, Applicants respectfully submit that Karlov, Brown, Emer, or their piecemeal hindsight combination, does not disclose, teach, or even suggest producing a modified list of routine identifiers prior to executing the routines identified in the modifier list.

In view of the foregoing remarks, Applicants respectfully submit that the cited references do not render claim 4 invalid. Given that claims 5-6, 8, 9, 24, and 25 are directly or indirectly dependent on claim 4, Applicants respectfully submit that these claims be allowable over the cited references for at least the same reasons that were provided above for claim 4. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejection of claims 4-6, 8, 9, 24, and 25.

IV. Rejection to Claims 10-13 and 37-40

In the Office Action, the Examiner rejected claims 10-12 and 37-39 under §103(a) as being unpatentable over Brown in view of Emer and claims 13 and 40 further in view of Dawson. Claims 11-13 are directly or indirectly dependent on claim 10. Claim 10 recites a method of processing a group of routines. The method determines an initial list of routine identifiers that identify the group of routines, where each routine identifier identifies a corresponding routine in the group of routines. The method identifies a set of at least two routine identifiers in the initial list of routine identifiers that are combinable into a single routine. The single routine is capable of performing each routine in the set of routines. Each routine includes a group of instructions. The method determines a single routine identifier that identifies the single routine. The identification of the combinable routine identifiers and the determination of the single routine identifier are performed by an automated set of instructions executed by the processor. The method stores the single routine identifier to a computer-readable medium.

Applicants respectfully submit that Brown, Emer, or their piecemeal hindsight combination does not disclose, teach, or even suggest the method of claim 10 for at least the following reasons. *First,* Applicants respectfully submit that these references do not disclose, teach, or even suggest a set of instructions executed by a processor for identifying a set of at least two routine identifiers that are combinable into a single routine prior to determining a single routine identifier that identifies the single routine. In the Office Action, the Examiner cited column 13, lines 48-49 and column 9, lines 21-28 of Brown to suggest such a limitation.

The Examiner first cites column 13, lines 49-49 of Brown to suggest an initial list of routines without condition codes and branching instructions. Then, the Examiner cites column 13, lines 2-9 and lines 48-52 of Brown specifying a sequence of per-vertex computations including branches to different sub-routines to suggest a single routine that combines at least two routines. However, nowhere within the cited lines or anywhere else within Brown is a set of instructions that are executed by a processor to identify a set of at least two routine identifiers that are combinable into a single identifier disclosed, taught, or even suggested. Rather, the subroutine and branching operations of Brown are manual operations that exist only after a programmer modifies the suggested initial list to make use of the subroutine and branching operations provided by Brown. Therefore, Applicants respectfully submit that nowhere within Brown, Emer, or their piecemeal hindsight combination is the set of instructions executed by a processor for identifying a set of at least two routine identifiers that are combinable into a single routine disclosed, taught, or even suggested to occur before determining a single routine identifier that identifies the single routine.

Second, Applicants respectfully submit that these references do not disclose, teach, or even suggest determining a single routine identifier that identifies at least two routines in the initial list of routine identifiers. In the Office Action, the Examiner cited column 4, lines 1-10, lines 16-17, and column 4, lines 60-63 of Emer stating that "since the fetched instructions are merged before being executed, this means that the instructions are combined into a single instruction. *See*, Office Action, page 20. However, Applicants respectfully submit that the cited lines of Emer do not disclose, teach, or even suggest determining a single routine identifier that identifies the single routine.

The Examiner first cites column 4, lines 16-17 of Emer which states that "each instruction is provided with a unique instruction identifier" for suggesting the determination of an initial list of routine identifiers. The Examiner then cites column 4, lines 60-63 of Emer which specifies combining instructions into a single queue to suggest determining a single routine identifier. Therefore, the Examiner has cited to two distinct objects of Emer for representing routine identifiers. Specifically, the instruction identifiers of column 4, lines 16-17 and the instruction queue of column 4, lines 60-63, whereas the method of claim 10 uses routine identifiers to identify the initial list of routines and the single combined routine. Accordingly, Applicants respectfully submit that Brown, Emer, or their piecemeal hindsight combination does not disclose, teach, or even suggest determining a single routine identifier that identifies at least two routines in the initial list of routine identifiers.

In view of the foregoing remarks, Applicants respectfully submit that Brown, Emer, or their piecemeal hindsight combination does not render claim 10 invalid. Given that claims 11-13 are dependent on claim 10, Applicants respectfully submit that these claims be allowable over the cited reference for at least the same reasons that were provided above for claim 10.

Furthermore, claims 37-39 were rejected along the same rationale as claim 10. Accordingly, claims 37-39 are patentable over Brown, Emer and their piecemeal hindsight combination, because the references do not disclose, teach, or even suggest a set of instructions executed by a processor for identifying a set of at least two combinable routine identifiers prior to determining a single routine identifier, as mentioned above. Additionally, claims 37-39 are patentable over the references as the references do not disclose, teach, or even suggest determining a single routine identifier that identifies at least two routines in the initial list of routine identifiers, as mentioned above. Therefore, Applicants respectfully submit that the cited references do not render claims 37-39 invalid. Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections to claims 10-13 and 37-39.

V. Rejection to Claims 14-22 and 41-44

In the Office Action, the Examiner rejected claims 14, 20, and 41 under 35 U.S.C. §103(a) as being unpatentable over Recker in view of Emer. The Examiner also rejected claims 15-19, 22, and 42-44 under §103(a) as being unpatentable over Recker and Emer in view of Ngai. The Examiner also rejected claim 21 under §103(a) over Recker and Emer in view of Dawson. Claims 15-22 are directly or indirectly dependent on claim 14. Claim 14 recites a method of executing a group of routines for processing by at least one processor. The method determines an initial list of routine identifiers that identify the group of routines, where each routine identifier identifies a corresponding routine. The method identifies a routine identifier in the initial list of routine identifiers as a sendable routine identifier that identifies a sendable routine, which may be processed by a second processor. Before executing the routines identified in the list of routine identifiers, the method modifies the list of routine identifiers to include the sendable routine identifier. The identification of the sendable routine and the modification of the list of routine identifiers are performed by an automated set of instructions executed by the processor. The method stores the modified list of routine identifiers to a computer-readable medium.

Applicants respectfully submit that Recker, Emer, or their piecemeal hindsight combination, does not specify identifying a routine identifier in the initial list of routine identifiers as a sendable routine and for modifying the list of routine identifiers to include the sendable routine identifier before executing the routines identified in the list of routine identifiers. In the Office Action, the Examiner cited column 1, lines 42-55 of Recker stating that "the first processor selectively sends graphic commands to a second processor." *See*, Office Action, page 23. However, Applicants respectfully submit that Recker identifies sendable commands for the co-processor at the time of instruction execution. As stated in Recker, a command is sent to the co-processor when the host CPU is confronted with a bottleneck or delay which occurs at the time of execution. *See*, Recker, column 1, lines 41-45. Therefore, Recker does not disclose a identifying a routine identifier as a sendable routine or modifying the list of routine identifiers to include the sendable routine before executing the routines identified in the list of routine identifiers.

Additionally, the Examiner cited column 4, lines 1-10 of Emer to suggest identifying and modifying the initial list to include the sendable routine identifier before executing the routines identified in the list of routine identifiers. The cited lines specify fetching up to eight instructions and merging the result of each fetch before the instructions are executed. However, nowhere within the merging of the fetched instructions does Emer disclose, teach, or even suggest modifying the initial list to include a sendable routine identifier, where the sendable routine identifier was not part of the initial list of routine identifiers. By only rearranging the order of the fetched instructions, Emer does not specify including new instruction identifiers into the already existing set of fetched instruction identifiers (i.e., the initial list of identifiers). Therefore, Applicants respectfully submit that Recker, Emer, or their piecemeal hindsight combination does not disclose, teach, or even suggest identifying a routine identifier in the initial list of routine identifiers and modifying the initial list of routine identifiers to include the sendable routine identifier before executing the routines identified in the list of routine identifiers.

In view of the foregoing remarks, Applicants respectfully submit that the cited references do not render claim 14 invalid. Given that claims 15-22 are dependent directly or indirectly on claim 14, Applicants respectfully submit that these claims be allowable over the cited references for at least the same reasons that were provided above for claim 14. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §103(a) rejection of claims 14-22.

Furthermore, claims 41-44 were rejected along the same rationale as claim 14. Accordingly, claims 41-44 are patentable over Recker, Emer, and their piecemeal hindsight combination, because the references do not disclose, teach, or even suggest identifying a routine identifier as a sendable routine and modifying the list of routine identifiers to include the sendable routine identifier before executing the routines identified in the list, as mentioned above. Therefore, Applicants respectfully submit that the cited references do not render claims 41-44 invalid. Applicants respectfully request reconsideration and withdrawal of the §103(a) rejections to claims 41-44.

VI. Allowable Claims 36 and 48

In the Office Action, the Examiner objected to claims 36 and 48 as being dependent upon a rejected base claim. The Examiner stated that claims 36 and 48 were otherwise allowable if rewritten in independent form. Applicants respectfully thank the Examiner for the allowance. However, Applicants respectfully have not rewritten any of these claims in independent form since Applicants respectfully believe that the rejected independent claims 34 and 46 are patentable over the cited references. In view of the foregoing, Applicants respectfully request reconsideration of allowable dependent claims 36 and 48.

VII. New Claims 50-51

In this Amendment, Applicants have added new claims 50-51. Applicants respectfully submit that claims 50-51 are fully supported by the specification. Claims 50 and 51 are directly dependent on claims 14 and 41. Accordingly, Applicants respectfully submit that claims 50-51 are in condition for allowance.

CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 1-51 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

ADELI LAW GROUP

Dated: June 19, 2007

/Mani Adeli/

Mani Adeli
Reg. No. 39,585

Adeli Law Group
A Professional Law Corporation
1875 Century Park East, Suite 1360
Los Angeles, CA 90067-2514
Phone: (310) 785-0140 x301
Fax: (310) 785-9558